Using Remotely Sensed Data and Hydrologic Models to Evaluate the Effects of Climate Change on Shallow Aquatic Ecosystems in the Mobile Bay, AL Estuary

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Coastal systems in the northern Gulf of Mexico, including the Mobile Bay, AL estuary, are subject to increasing pressure from a variety of activities including climate change. Climate changes have a direct effect on the discharge of rivers that drain into Mobile Bay and adjacent coastal water bodies. The outflows change water quality (temperature, salinity, and sediment concentrations) in the shallow aquatic areas and affect ecosystem functioning. Mobile Bay is a vital ecosystem that provides habitat for many species of fauna and flora. Historically, submerged aquatic vegetation (SAV) and seagrasses were found in this area of the northern Gulf of Mexico; however the extent of vegetation has significantly decreased over the last 60 years. The objectives of this research are to determine: how climate changes affect runoff and water quality in the estuary and how these changes will affect habitat suitability for SAV and seagrasses. Our approach is to use watershed and hydrodynamic modeling to evaluate the impact of climate change on shallow water aquatic ecosystems in Mobile Bay and adjacent coastal areas. Remotely sensed Landsat data were used for current land cover land use (LCLU) model input and the data provided by Intergovernmental Panel on Climate Change (IPCC) of the future changes in temperature, precipitation, and sea level rise were used to create the climate scenarios for the 2025 and 2050 model simulations. Project results are being shared with Gulf coast stakeholders through the Gulf of Mexico Data Atlas to benefit coastal policy and climate change adaptation strategies.

CURRENT SECTION/FOCUS GROUP: Ocean Sciences

CURRENT SESSION: OS032. Satellite Ocean and Coastal Applications - Current and Future

INDEX TERMS: [0439] BIOGEOSCIENCES / Ecosystems, structure and dynamics, [1616] GLOBAL CHANGE / Climate variability, [1847] HYDROLOGY / Modeling, [0480] BIOGEOSCIENCES / Remote sensing.

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